

REMARKS

The present Amendment is in response to the Examiner's Final Office Action mailed September 25, 2007. Claims 10, 18-29, 31 and 39 are cancelled, claims 1-9, 11-17, 30, 32-35, and 36-38 are amended, and new claims 40-46 are added. Claims 1-9, 11-17, 30, 32-38 and 40-46 are now pending in view of the above amendments.

Reconsideration of the application is respectfully requested in view of the above amendments to the claims and the following remarks. For the Examiner's convenience and reference, Applicant's remarks are presented in the order in which the corresponding issues were raised in the Office Action.

Please note that the following remarks are not intended to be an exhaustive enumeration of the distinctions between any cited references and the claimed invention. Rather, the distinctions identified and discussed below are presented solely by way of example to illustrate some of the differences between the claimed invention and the cited references. In addition, Applicants request that the Examiner carefully review any references discussed below to ensure that Applicants understanding and discussion of the references, if any, is consistent with the Examiner's understanding.

I. PRIOR ART REJECTIONS

A. Rejection Under 35 U.S.C. § 103

The Examiner rejects claims 1-4, 6-11, 13, 15-19, 21-23, 25-27, 32-34, 36, 38, and 39 under 35 U.S.C. § 103 as being unpatentable over *Aronson et al.* (WO 02/063800). The Examiner rejects claims 5, 14, and 29 under 35 U.S.C. § 103 as being unpatentable over *Aronson et al.* (WO 02/063800) in view of *Chen* (U.S. Patent No. 5,337,396). The Examiner rejects claims 12 and 24 under 35 U.S.C. § 103 as being unpatentable over *Aronson et al.* (WO 02/063800) in view of *Buss et al.* (U.S. Patent Publication No. 2002/0196501). The Examiner rejects claims 20, 35, and 37 under 35 U.S.C. § 103 as being unpatentable over *Aronson et al.* (WO 02/063800) in view of *Cohen et al.* (U.S. Patent No. 6,985,645). The Examiner rejects claim 28 under 35 U.S.C. § 103 as being unpatentable over *Aronson et al.* (WO 02/063800) in view of *Hamilton-Gahart et al.* (U.S. Patent No. 6,665,497). The Examiner rejects claims 30

and 31 under 35 U.S.C. § 103 as being unpatentable over *Aronson et al.* (WO 02/063800) in view of *Brezina et al.* (U.S. Patent Publication No. 2003/0085452).

Claims 10, 18-29, 31 and 39 are canceled, therefore the rejection of those claims are moot.

The Applicants respectfully traverse the rejection of claims 1-9 and 11-17 at least for the reason that the references relied upon do not teach or suggest each and every element of the claims. The Applicants respectfully traverse the rejection of claims 18-38, as the Applicants' claimed invention satisfies a long-felt-need in the industry in a manner not previously contemplated by those of ordinary skill in the art. Moreover, the manner in which the invention of claims 18-38 satisfies this long-felt-need is based on superior and newly discovered advantages by the Applicants as expressly disclosed in the Applicant's specification.

According to the applicable statute, a claimed invention is unpatentable for obviousness if the differences between it and the prior art "are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art." 35 U.S.C. § 103(a) (2005); *Graham v. John Deere Co.*, 383 U.S. 1, 14 (1966); MPEP 2142. Obviousness is a legal question based on underlying factual determinations including: (1) the scope and content of the prior art, including what that prior art teaches explicitly and inherently; (2) the level of ordinary skill in the prior art; (3) the differences between the claimed invention and the prior art; and (4) objective evidence of nonobviousness. *Graham*, 383 U.S. at 17-18; *In re Dembiczak*, 175 F.3d 994, 998 (Fed. Cir. 1999).

"The key to supporting any rejection under 35 U.S.C. 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious." MPEP 2142 (2007). Analysis supporting a rejection under 35 U.S.C. §103(a) should be made explicit. *KSR Int'l Co. v. Teleflex, Inc.*, 82 USPQ2d 1385, 1396 (2007). Moreover, the Patent Office must identify a reason (such as motivation) why a person of ordinary skill in the art would have combined the prior art elements in the manner claimed. *Id.* "[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *Id. quoting In re Kahn*, 441 F.3d 977, 988 (CA Fed. 2006); *see also* MPEP 2142.

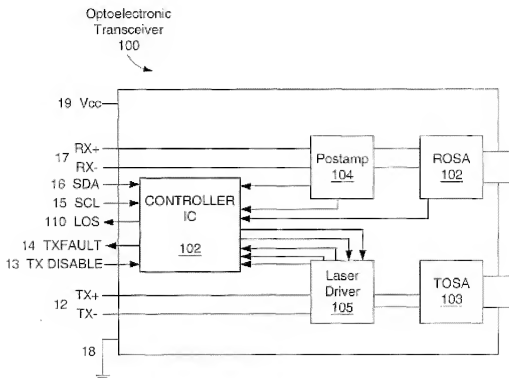
On the outset, the Applicants note that several claims have been amended to change the word “comprising” to “including” more clearly differentiating the preamble of the claims from the body of the claims by the term “comprising”. As the Examiner knows, there are three parts to a claim: the preamble, the transition, and the body. *See* 37 C.F.R. § 1.75. In patent law, certain terms have a special meaning when used as a transitional phrase that cannot be changed by individual parties. *See In re Gray*, 53 F.2d 520, 521 (CCPA 1931). However, these terms are only afforded this special meaning when they are used as the transitional phrase. *Schering Corp. v. Amgen Inc.*, F. Supp. 2d 372, 382-83 (D. Del. 1998). Therefore, when the terms “comprising” and “including,” are used in the body of a claim, and not in the transition, they will be interpreted according to the normal rules of claim interpretation. *See Moleculon Research Corp. v. CBS, Inc.* 793 F.2d 1261, 1271-72 & n.8 (Fed. Cir. 1986) (construing “comprising”).

The ordinary meaning of the term “comprising” creates an open-ended presumption that the recited elements following the term are a part of the device, but does not exclude additional, unrecited elements. *Crystal Semiconductor Corp. v. TriTech Microelectronics International, Inc.*, 246 F.3d 1336, 1348 (Fed. Cir. 2001). This open ended interpretation is the Applicants’ intent for construction of the term “comprising” in the claims. “The claim term ‘including’ is synonymous with ‘comprising,’ thereby permitting the inclusion of unnamed components.” *Regents of University of California v. Eli Lilly & Co.*, 119 F.3d 1559, 1573 (Fed. Cir. 1997), *cert. denied*, 523 U.S. 1089 (1998); *Hewlett-Packard Co. v. Repeat-O-Type Stencil Manuf. Corp.* 123 F.3d 1445, 1451 (Fed. Cir. 1997). This open ended construction of “including” is also the Applicants’ intent in the claims. Thus, where the Applicants have changed the term “comprising” to “including” the meaning of such terms is not intended to be changed. But rather, to define the end of the preamble of the claims, and the beginning of the body of the claims by use of the term “comprising” as the transitional phrase.

Claim 1 includes an assembly of a distinct transmitter optical assembly and a distinct receiver optical assembly to a host. The connection of the transmitter optical assembly and the receiver optical assembly to the host is facilitated by a transmitter optical assembly connector and a separate receiver optical assembly connector respectively. Newly presented claim 40 further provides that such optical assembly connectors are edge connectors and the host includes receptacles for releasably receiving such edge connectors.

Moreover, claim 1 requires a transmit integrated circuit including laser control mounted on the transmitter substrate and a separate receiver integrated circuit including processing control mounted on the separate receiver substrate.

In direct contrast, Figure 2 of *Aronson* (reproduced below) discloses a single “transceiver 100 [that] contains a receiver optical subassembly (ROSA) 102 and Transmitter Optical Subassembly (TOSA) 103 along with associated post-amplifier 104 and laser driver 105 integrated circuits.... In this case, however, all other control and setup functions are implemented with a third single-chip integrated circuit 110 [misprinted below as 102] called the controller IC.” Page 6, lines 19-24 (emphasis added).



Thus, *Aronson* does not teach the invention set forth in claim 1 as *Aronson* does not teach distinct transmitter optical and receiver optical assemblies connected to a host, nor does *Aronson* teach that the laser control and receiver processing are mounted on separate substrates on the separate transmitter and receiver optical assemblies as required by claim 1. As such, the Applicant respectfully requests that the rejection of claim 1 be withdrawn.

Claims 2-9 and 11-17 depend from claim 1. If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071

(Fed. Cir. 1988). Therefore, the Applicant respectfully requests that the rejection of claims 2-9 and 11-17 be withdrawn for at least the same reasons as claim 1.

Claim 30 is directed to a transceiver that includes, in part, an integrated circuit that includes a modulator configured to provide adjustable current to a laser source, a post amplifier configured to receive electrical data from a photo detector, and a processor configured to receive diagnostic data from a host computer. Thus, as set forth in claim 30, each of these components are included in a single integrated circuit.

On pages 3 and 4 of the Office Action, the Examiner admits that “*Aronson* does not teach that the components are all on one integrated circuit.” Further on page 13 of the Office action the Examiner admits that “*Aronson* does not explicitly teach that the impedance of the data is minimized by the transceiver components.” However, the Examiner argues on pages 3-4 of the Office Action that “[i]t would have been obvious to one of ordinary skill in the art at the time of the invention to integrate the assembly of *Aronson* on an integrated circuit, since it has been held that the use of a one piece construction instead of the non-integrated structure of the prior art would be merely a matter of obvious engineering choice. [citing to *Larson*]. The motivation would have been to make the assembly smaller.” (Emphasis added). Further, on page 13, the Examiner argues that “*Brezina* teaches reducing impedance of high frequency data using transceiver components) page 4, paragraph 58). However, neither *Aronson* nor *Brezina* disclose or suggest reducing mismatched electrical impedance of high frequency data by incorporating the claimed elements in a single integrated circuit.”

Integration of the components of claim 30 in a single integrated circuit goes beyond simple size reduction. As disclosed by the Applicants, there is a long felt need in the art to reduce mismatched electrical impedance which has been tried and not fully achieved by various conventional apparatus and methods including tuning circuitry or increased power which is not advantageous in high frequency systems. For example, paragraphs 13-15 of the Applicants specification specifically disclose some of the previous attempts to overcome the problems presented by mismatched impedances in traditional optical assemblies.

[0013] Reflections such as these can occur at varying degrees in a conductive pathway since there are a wide variety of possible discontinuities. In particular, the larger and more abrupt the discontinuity, the more power that is required to pass the electronic data signals through the given discontinuities from one point to the next. Hence, one conventional method for overcoming discontinuities is by

adding power to the electrical signals. While this can work in low frequency systems that have relatively low energy requirements, systems that pass higher frequency data signals may not necessarily benefit from simply adding power to the signal. In particular, while simply adding power to a higher frequency electrical signal (e.g., an electrical signal representing data bits) can increase the amplitude of the electrical signal, the higher frequency data may be no more intelligible than before amplification.

[0014] Other conventional methods of overcoming reflections include adding impedance matching components along a conductive pathway. Generally, matching components are designed to reduce or eliminate reflections that occur by turning the reflections into heat in a resistor. Ideally, reducing the reflections to heat allows the electronic signal to pass through discontinuities without significantly muddying the data. Unfortunately, matching components require added power to operate effectively, and, moreover, reduce the amplitude of the electronic data signal in the process.

[0015] Furthermore, discontinuities can present a special problem to systems implementing high frequency data transmissions. For example, discontinuities tend to have greater significance when the length of the conductive pathway is much greater than the wavelength of the electrical signal representing the high speed data. By contrast, discontinuities tend to have less significance when the length of a given conductive pathway is much less than the electrical signal's wavelength. At 2.5 gigabits per second, for example, one electrical signal wavelength is approximately 6 cm. At 10 gigabits per second, the electrical signal wavelength is approximately 1-1.5 cm. This means that any conductive pathway longer than 1-1.5 mm (roughly 1 tenth of 1.5 cm) presents a particular problem for electrical signals representing data transmission in the 10 gigabit per second range.

(Emphasis added).

Similar to these prior art attempts to solve the problem of mismatched impedances, *Brezina* attempts to solve such problems in arrays of assemblies by placing chipsets in close proximity to decrease electrical path lengths, thereby reducing impedance and electrical cross talk. However, *Brezina* admits a problem that such configuration also results in high heat density. Para. [0058]. Thus, neither *Brezina*, nor *Aronson*, realize or exploit the Applicant's solution to such problems by the particular solution disclosed by that Applicants – that is by integrating the multiple components of the optical transceiver circuitry in a single integrated circuit.

Applicants thus provide a way of improving the performance of optical transceivers that goes beyond simply reducing the size of the optical transceivers. Rather, the Applicants' have discovered a simple, yet important, simplification of circuitry that has unexpected and superior reduction in impedance mismatched problems as opposed to that experienced in prior art embodiments.

A *prima facie* case of obviousness is rebuttable by proof that the claimed invention possesses unexpected advantageous or superior properties. See *In re Papesch*, 315 F.2d 381 (emphasis added). Such simplification disclosed by the Applicants eliminates the need to add power to electrical signals, and can eliminate the need for impedance matching components along conductive pathways thereby providing a reduction in parts while retaining the benefits of such parts as disclosed by the Applicants.

As previously discussed, a reduction in parts with retention of their function is indicia of non-obviousness. Such simplification eliminates added power required to operate such matching components effectively along with the deleterious effects thereof, and reduces the amplitude of the electronic data signal in the process as disclosed in paragraph 14 of the Applicants' specification. Thus, the Applicants respectfully request that the rejection of claim 30 be withdrawn as neither *Aronson* nor *Brezina* disclose or suggest the particular solution to this important problem in high frequency data transmission systems as set forth by the Applicants in claim 30. The Applicants respectfully request that the rejection of claim 36 be withdrawn for reasons similar to that set forth regarding claim 30.

Claim 31 depends from claim 30 and claims 37 and 38 depend from claim 36. If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988). Therefore, the Applicant respectfully requests that the rejection of claims 31, 37, and 38 be withdrawn for at least the same reasons as claims 30 and 36.

II. NEW CLAIMS

Claims 40-46 are added and depend from claim 1 or claim 30. Therefore, claims 40-46 are believed to be allowable at least for the same reasons as claim 1 or claim 30

CONCLUSION

In view of the foregoing, Applicants believe the claims as amended are in allowable form. In the event that the Examiner finds remaining impediment to a prompt allowance of this application that may be clarified through a telephone interview, or which may be overcome by an Examiner's Amendment, the Examiner is requested to contact the undersigned attorney.

Dated this 21st day of February, 2008.

Respectfully submitted,

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